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Drainage Control Activities by Grassland Area Farmers

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Introduction

The Grassland Area Farmers formed a regional drainage entity in March 1996 under the umbrella of the San Luis and Delta-Mendota Water Authority to implement the Grassland Bypass Project. The Project consolidates subsurface drainage flows on a regional basis and utilizes a portion of the federal San Luis Drain to convey the flows around the habitat areas (see Figure 1). Participants include the Broadview Water District, Charleston Drainage District, Firebaugh Canal Water District, Pacheco Water District, Panoche Drainage District, Widren Water District and the Camp 13 Drainage District (located in part of Central California Irrigation District). This entity includes approximately 97,000 gross acres of irrigated farmland on the westside of the San Joaquin Valley, referred to as the Grassland Drainage Area. The area is highly productive, producing an estimated \$113 Million annually in agricultural crop market value, with an additional estimated \$126 Million generated for the local and regional economies, for a total estimated economic value of \$239 Million.

The Grassland Area Farmers have implemented several activities aimed at reducing discharge of subsurface drainage waters to the San Joaquin River. These activities have included the Grassland Bypass Project and the San Joaquin River Water Quality Improvement Project. They also include: formation of a regional drainage entity, newsletters and other communication with the farmers, a monitoring program, using State Revolving Fund loans for improved irrigation systems, utilizing and installing drainage recycling systems to mix subsurface drainage water with irrigation supplies under strict limits, tiered water pricing and tradable loads programs.

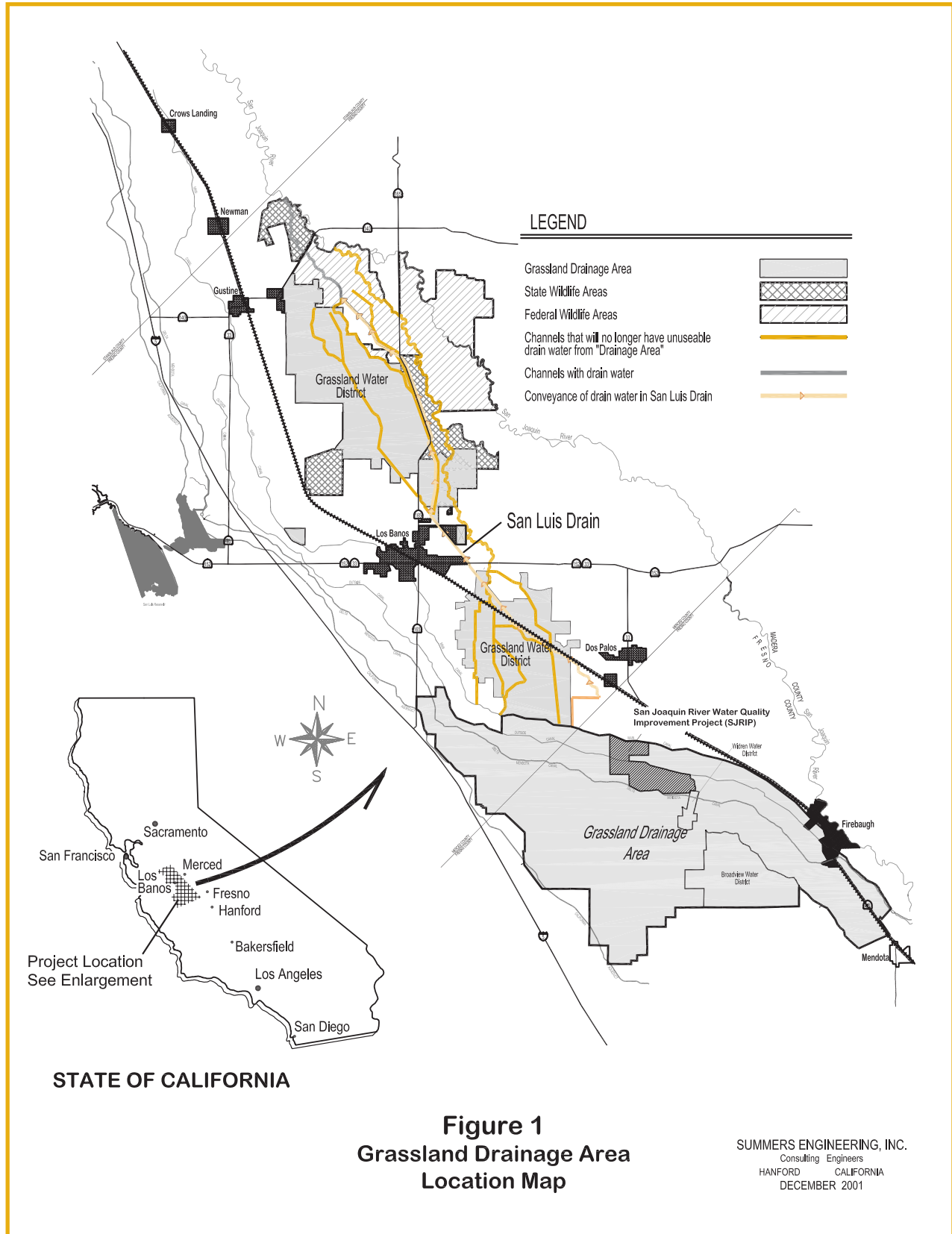
Grassland Bypass Project

The Grassland Bypass Project is an innovative program that was designed to improve water quality in the channels used to deliver water to wetland areas. Prior to the Project, subsurface drainage water was conveyed through those channels in route to the San Joaquin River and limited their availability to deliver high-quality habitat supplies. The Project consolidates subsurface drainage flows on a regional basis and utilizes a portion of the federal San Luis Drain to convey the flows around the habitat areas. Figure 2 shows the discharge from the Grassland Bypass Project for the initial 5 years including Water Year (WY) 2001.

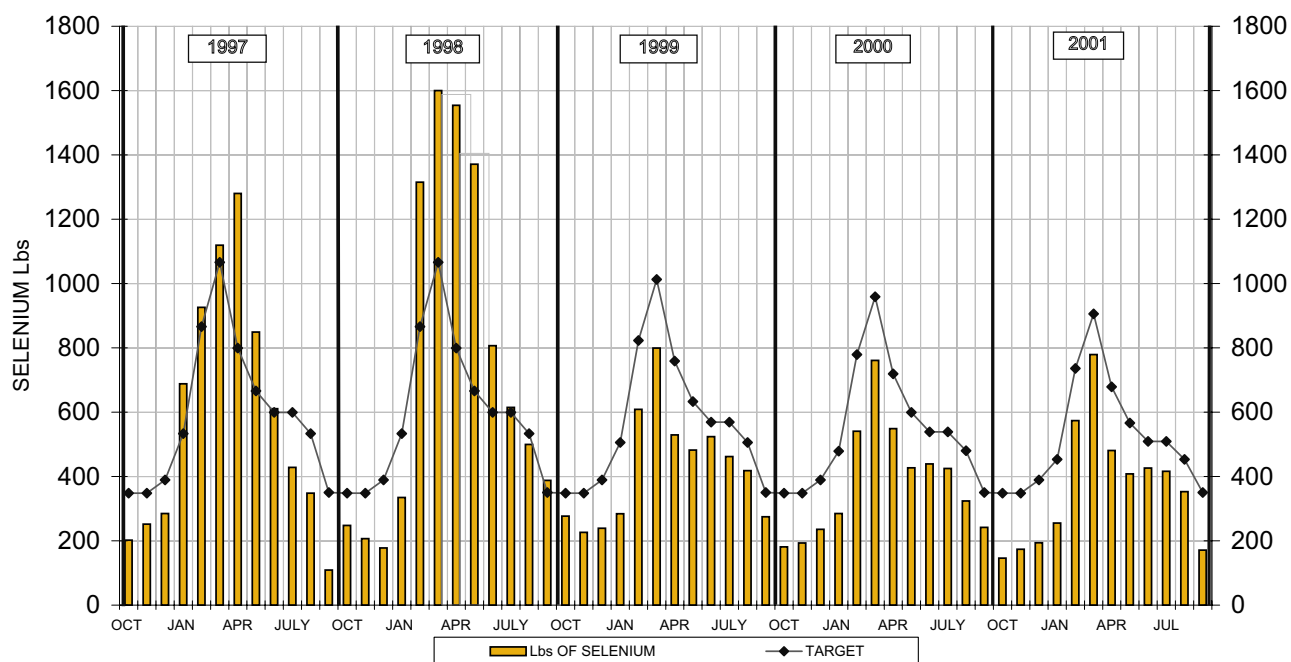
Negotiations between the San Luis & Delta-Mendota Water Authority and the U.S. Bureau of Reclamation to utilize a portion of the San Luis Drain for the Project commenced in 1988. Stakeholders included in the process were: U.S. Environmental Protection Agency, U.S. Fish & Wildlife Service, California Department of Fish and Game, the Central Valley Regional Water Quality Control Board, Environmental Defense, Contra Costa County and Contra Costa Water District. In late 1995, environmental documentation for the first five years was completed and the Use Agreement was signed. Discharge through the project began in September 1996. In September 2001, the Use Agreement was extended for another 8 years and 3 months (through December 2009). An Environmental Impact Report/Environmental Impact Statement was completed and on September 7, 2001 the Central Valley Regional Water Quality Control Board issued new Waste Discharge Requirements. Other items completed to support the continued use were a Biological Assessment/Biological Opinion, a selenium Total Maximum Monthly Load (TMML) report submitted by the Regional Board to EPA, and a continued monitoring program. The new Use Agreement contains continued reductions in selenium discharge until ultimately TMML limits are achieved in 2005 for above normal and wet years and continued progress is made to meet water quality objectives in 2010 for below normal, dry and critical years. The future load limits are shown on Figure 3.

The benefits of the Grassland Bypass Project are well documented. In WY 2001, drainage volume has been reduced 47%, selenium load has been reduced 56%, salt load has been reduced 28% and boron load has been reduced 41%, all from pre-project conditions in WY 1996. In WY 1996, prior to the Grassland Bypass Project, the mean selenium concentration in Salt Slough at Lander Avenue was 16 $\mu\text{S}/\text{cm}$. Since October 1996, the 2 $\mu\text{S}/\text{cm}$ water quality objective for Salt Slough has been met in all months except one. The only month in which objectives were not met was February 1998 when uncontrollable flood flows were mixed with subsurface drainage water and could not be contained within the Grassland Bypass Project (that month the selenium concentration in Salt Slough was 4 $\mu\text{S}/\text{cm}$). In WY 1996 the mean selenium concentration at Camp 13 Ditch was 55.9 parts per billion ($\mu\text{S}/\text{cm}$). In WY 1997, the first year of operation of the Grassland Bypass Project, the mean selenium concentration at Camp 13 Ditch was 2.6 $\mu\text{S}/\text{cm}$. This value was slightly above the wetland selenium objective of 2 $\mu\text{S}/\text{cm}$. In April, 1998, specific actions

Figure 1. Grassland Drainage Area Location Map



**Figure 2. Discharge from the Grassland Bypass Project
October 1996 through September 2001**



**Figure 3. Grassland Drainage Area
Selenium Discharge and Targets**

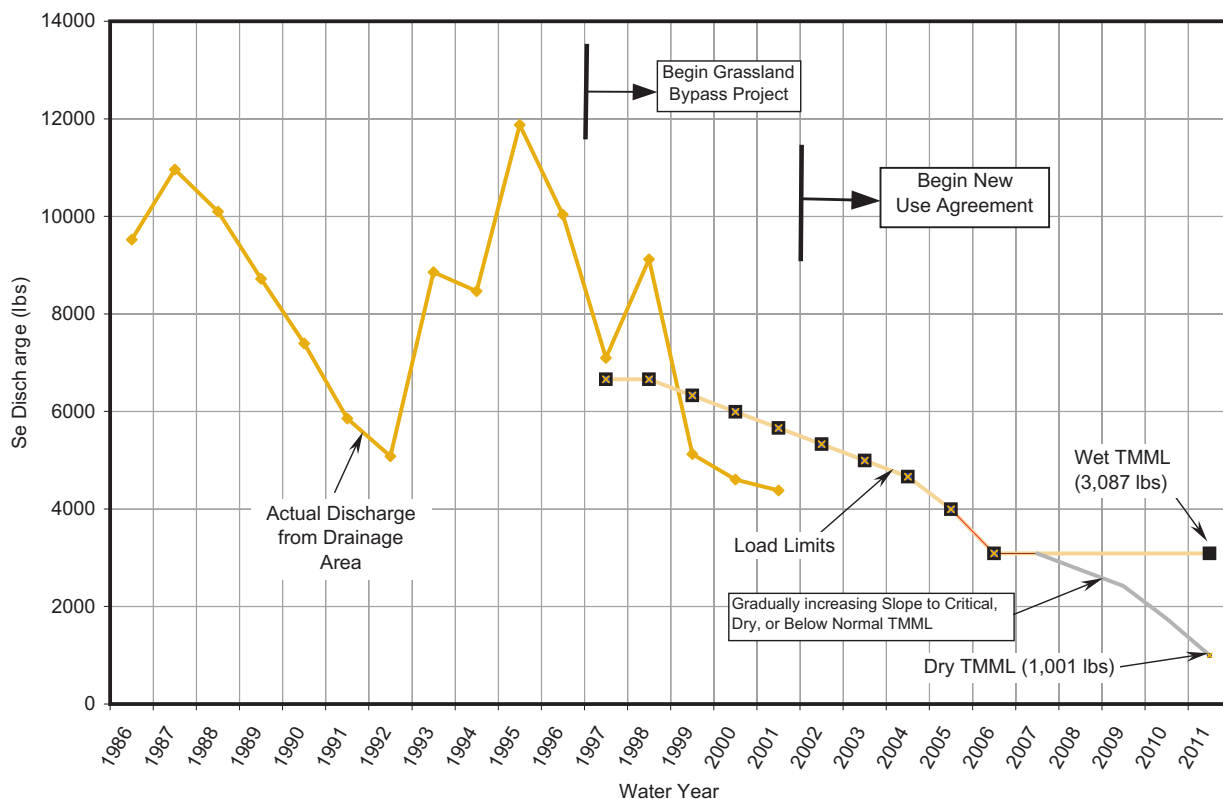


Figure 4

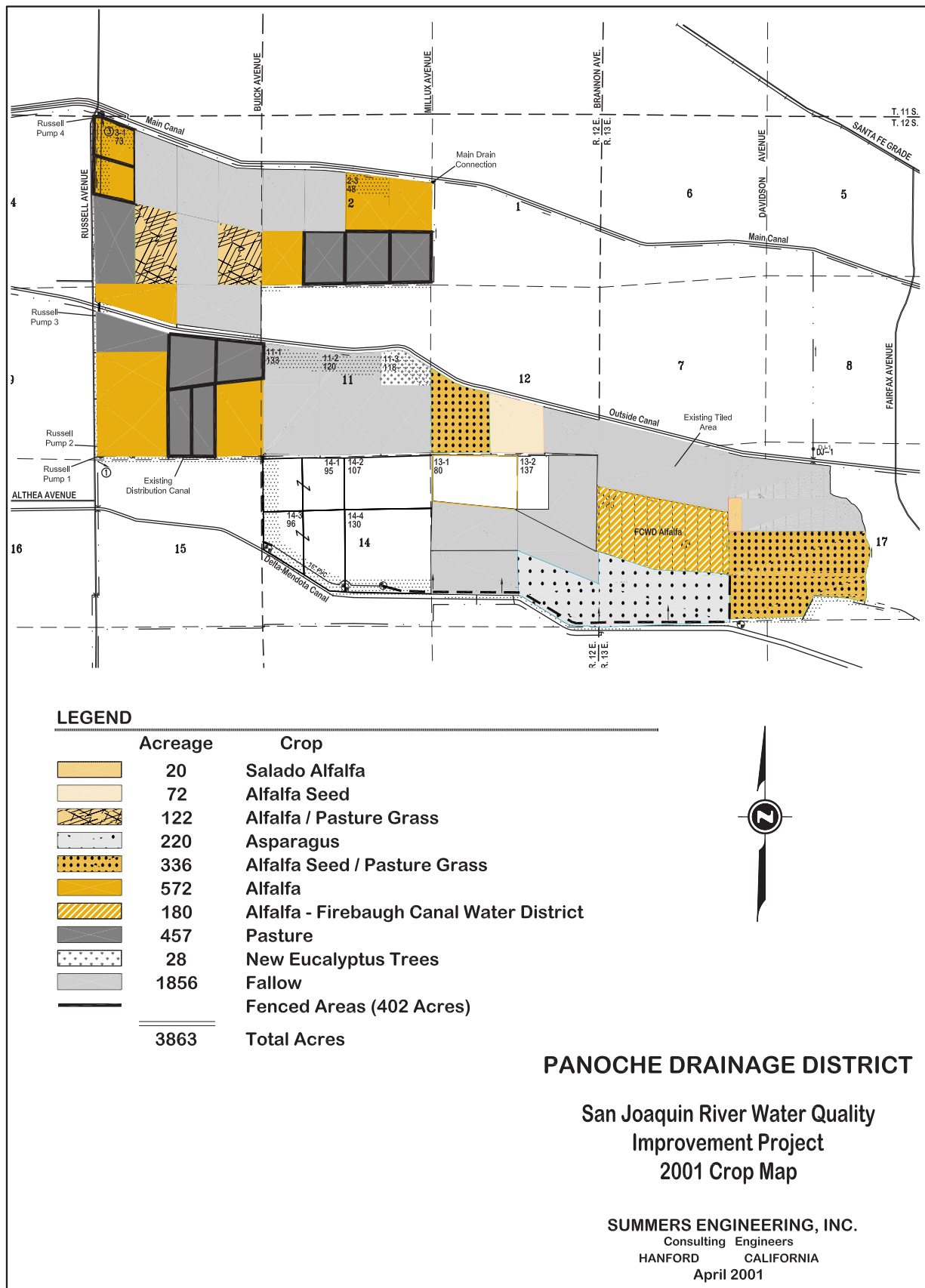
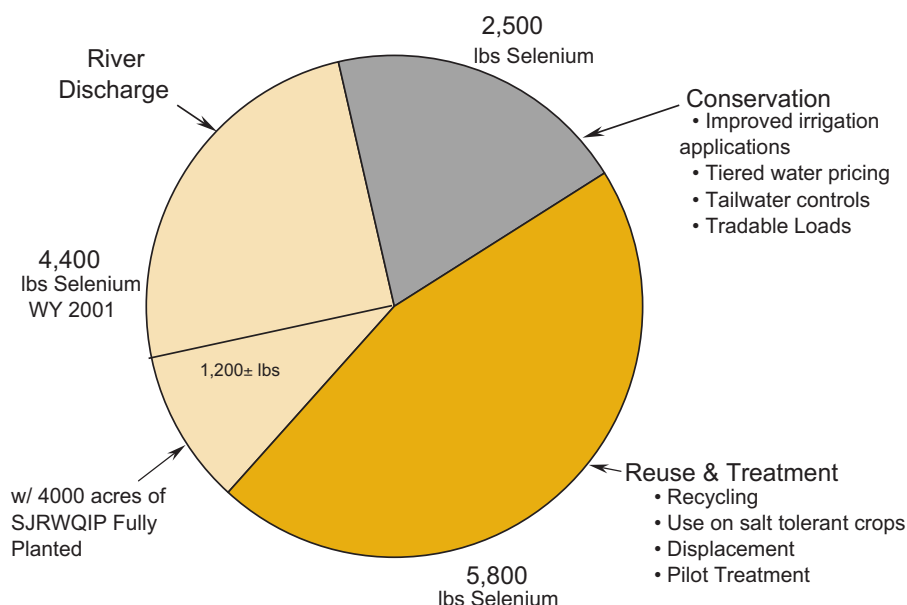


Figure 5. Historic Drainage Water (lbs selenium)
57,000 AF 12,700 lbs Se 240,000 Tons Salt



were taken to eliminate any possible subsurface drainage discharges from the Grassland Drainage Area into the Camp 13 Slough and other discharge points. Since that time there have been no discharges from the Grassland Drainage Area into wetland channels.

San Joaquin River Water Quality Improvement Project

Funds provided from Proposition 13 allowed for the purchase and improvement of 4,000 acres of land within the Grassland Drainage Area as part of the San Joaquin River Water Quality Improvement Project (SJRIIP) for the purpose of drain water disposal. The first phase of the SJRIIP was implemented in the winter of WY 2001 with the planting of salt tolerant crops and construction of distribution facilities. 1,821 acres were irrigated with drainage water or blended water. This resulted in a displacement of 1,025 pounds of selenium, 14,500 tons of salt and 62,000 pounds of boron, which were prevented from discharging to the Grassland Bypass Project and to the San Joaquin River. The location of the SJRIIP Project is shown in Figure 1 and the cropping details for WY 2001 are shown in Figure 4. The SJRIIP project is the key for the Grassland Drainage Area as a whole to meet future selenium load limits. This project will ultimately allow for planting and irrigation of the entire 4,000 acres with drainage water. Future phases

call for acquisition of additional acreage, installation of subsurface drainage systems and implementation of treatment and salt disposal components.

A component of this future phase is being implemented with Proposition 13 funds. Subsurface drains are being installed in 550 acres within the SJRIIP area. Irrigation systems are being improved to distribute drainage water to the land and crops are being planted to utilize the subsurface drainage water. This project is called the Grassland Integrated Drainage Management Project.

Other Activities

The Grassland Area Farmers and member districts are continuing advances into drainage management and disposal with the cooperation of federal and state agencies. Research is being undertaken in algal bacteria selenium treatment, reverse osmosis treatment, flow through selenium removal and individual district reuse projects. Continued funding is being sought for these activities. An estimate has been made of the components of subsurface drainage within the GDA. This information is shown in Figure 5.

Future regulations may include salt and boron discharge limits to the San Joaquin River. The Grassland Area Farmers are active participants in this process as well other regulatory efforts such as the dissolved oxygen issue in the San Joaquin River.